

Amendments to the Claims

This listing of claims will replace all prior versions and listings of claims in the application.

Listing of Claims

1. (Currently Amended) A catheter system for stent delivery to a vessel bifurcation, the vessel bifurcation having a main vessel and a branch vessel, comprising:

a catheter extending between a distal end and a proximal end, the catheter including a main vessel guidewire lumen that is adapted to receive a main vessel guidewire;

a stent being disposed over the catheter, the stent having a side hole through a wall thereof;

a first catheter radiopaque marker arranged on the catheter distal of the stent;

a second catheter radiopaque marker arranged on the catheter proximal of the stent;

a third catheter radiopaque marker arranged on the catheter aligned with the side hole of the stent;

a side member disposed adjacent the catheter, the side member extending between a free distal end and a proximal end, the side member including a branch vessel guidewire lumen that is adapted to receive a branch vessel guidewire, the side member being fixedly attached to the catheter at a location proximal the stent, the free distal end of the side member arranged to extend through the side hole in the stent to a position distal of the side hole in the stent;

a first side member radiopaque marker positioned on the side member at the free distal end of the side member;

a second side member radiopaque marker positioned on the side member at a location spaced from the first side member radiopaque marker, wherein the second side member radiopaque marker is arranged to be aligned with the side hole of the stent when the free distal end of the side member extends into the branch vessel;

wherein ~~at least one of~~ the first catheter radiopaque marker and the first side member radiopaque marker are arranged side-by-side in a first configuration ~~[[or]] and~~ the third catheter radiopaque marker and the second side member radiopaque marker are arranged side-by-side in a first configuration, wherein the ~~at least one~~ first side member radiopaque marker and first catheter radiopaque marker ~~or second side member radiopaque marker and third catheter radiopaque~~

~~marker~~ are separated in a second configuration to indicate that the free distal end of the side member is advancing into the branch vessel.

2-6. (Canceled)

7. (Previously Presented) The catheter system of claim 1, wherein the side member is flexible.

8. (Previously Presented) The catheter system of claim 1, further comprising a branch stent deployment device having a balloon, a guidewire lumen, an inflation lumen that is adapted to supply a fluid to inflate the balloon, and a branch vessel stent disposed over the balloon, wherein the branch stent deployment device is adapted to be advanced over the branch vessel guidewire.

9-10. (Canceled)

11. (Original) The catheter system of claim 1, further comprising a balloon disposed at the distal end of the side member.

12. (Original) The catheter system of claim 1, wherein the distal end of the side member is tapered.

13. (Original) The catheter system of claim 1, wherein the distal end of the side member is fabricated from a fluoroscopically visible material.

14. (Previously Presented) The catheter system of claim 1, wherein the catheter and the side member are fabricated from Pebax and graphite.

15. (Previously Presented) The catheter system of claim 1, further comprising a branch stent positioned on the side member.

16. (Previously Presented) The catheter system of claim 1, wherein the catheter further includes a balloon inflation lumen, and further comprising a proximal end hub having a main vessel guidewire channel that is coupled to the main vessel guidewire lumen, a branch vessel guidewire channel that is coupled to the branch vessel guidewire lumen, and a balloon inflation port that is coupled to the balloon inflation lumen.

17. (Previously Presented) The catheter system of claim 16, wherein the first and second guidewire channels are separated by about zero to 20°.

18. (Previously Presented) The catheter system of claim 1, wherein the distal end of the side member is unattached to the distal end of the catheter.

19. (Previously Presented) The catheter system of claim 18, wherein the length over which the distal end of the side member is unattached to the distal end of the catheter is approximately 2 to approximately 10 cm.

20-41. (Canceled)

42. (Previously Presented) The catheter system of claim 1, wherein the side member is fixedly attached to the catheter at or near the proximal end of the catheter.

43. (Previously Presented) The catheter system of claim 42, wherein the side member is fixedly attached to the catheter along a length from the proximal end of the catheter to a location proximal to the stent.

44. (Previously Presented) The catheter system of claim 1, wherein the side member is fixedly attached to the catheter at a location that is spaced a distance from and is proximal to the stent.

45. (Previously Presented) The catheter system of claim 1, further comprising an expander disposed near the distal end of the catheter and wherein the stent is disposed over the

expander such that upon expansion of the expander, the stent is configured to expand.

46. (Previously Presented) The catheter system of claim 45, wherein said expander is a balloon.

47. (Previously Presented) the catheter system of claim 1, wherein an outer diameter of the catheter is different than an outer diameter of the side member.

48. (Previously Presented) The catheter system claim 1, wherein the side member has a circular cross-section.

49. (Canceled)

50. (Currently Amended) A catheter system for stent delivery to a vessel bifurcation, the vessel bifurcation having a main vessel and a branch vessel, comprising:

a catheter having a distal end, a proximal end, and a main vessel guidewire lumen that is adapted to receive a main vessel guidewire;

a stent having a side hole through a wall thereof, the stent being disposed over the catheter, wherein the stent hole is substantially alignable with a branch vessel when the stent hole is disposed substantially in the main vessel prior to expansion;

a first catheter radiopaque marker arranged on the catheter distal of the stent;

a second catheter radiopaque marker arranged on the catheter proximal of the stent;

a third catheter radiopaque marker arranged on the catheter aligned with the side hole of the stent;

a side member disposed adjacent the catheter, the side member having a distal end, a proximal end, and a branch vessel guidewire lumen that is adapted to receive a branch vessel guidewire, the side member being integral with the catheter at a location proximal the stent wherein the distal portion of the side member is disposed at least partially within a portion of the stent and at least partially extending through and distal of the side hole of the stent;

a first side member radiopaque marker positioned on the side member at the distal end of the side member;

a second side member radiopaque marker positioned on the side member at a location spaced from the first side member radiopaque marker, wherein the second side member radiopaque marker is aligned with the side hole of the stent when the distal end of the side member has passed through the side hole and into the branch vessel;

wherein said catheter radiopaque markers and said side member radiopaque markers are moveable from a first configuration to a second configuration, wherein in the first configuration the first catheter radiopaque marker and the first side member radiopaque marker are side-by-side, wherein in the second configuration at least one of the side member radiopaque markers is separated from at least one of the catheter radiopaque markers.

51. (Previously Presented) The catheter system of claim 50, wherein the side member is flexible.

52. (Previously Presented) The catheter system of claim 50, further comprising a branch stent deployment device having a balloon, a guidewire lumen, an inflation lumen that is adapted to supply a fluid to inflate the balloon, and a branch vessel stent disposed over the balloon, wherein the branch stent deployment device is adapted to be advanced over the branch vessel guidewire.

53. (Canceled)

54. (Previously Presented) The catheter system of claim 50, further comprising a balloon disposed at the distal end of the side member.

55. (Previously Presented) The catheter system of claim 50, wherein the distal end of the side member is tapered.

56. (Previously Presented) The catheter system of claim 50, wherein the distal end of the side member is fabricated from a fluoroscopically visible material.

57. (Previously Presented) The catheter system of claim 50, wherein the catheter and

the side member are fabricated from Pebax and graphite.

58. (Previously Presented) The catheter system of claim 50, further comprising a branch stent positioned on the side member.

59. (Previously Presented) The catheter system of claim 50, further comprising an expander disposed near the distal end of the catheter and wherein the stent is disposed over the expander such that upon expansion of the expander, the stent is configured to expand.

60. (Previously Presented) The catheter system of claim 59, wherein said expander is a balloon.

61. (Previously Presented) The catheter system of claim 60, wherein the catheter further includes a balloon inflation lumen, and further comprising a proximal end hub having a main vessel guidewire channel that is coupled to the main vessel guidewire lumen, a branch vessel guidewire channel that is coupled to the branch vessel guidewire lumen, and a balloon inflation port that is coupled to the balloon inflation lumen.

62. (Previously Presented) The catheter system of claim 61, wherein the first and second guidewire channels are separated by about zero to 20°.

63. (Previously Presented) The catheter system of claim 50, wherein the distal end of the side member is unattached to the distal end of the catheter.

64. (Previously Presented) The catheter system of claim 63, wherein the length over which the distal end of the side member is unattached to the distal end of the catheter is approximately 2 to approximately 10 cm.

65. (Previously Presented) The catheter system of claim 50, wherein the side member is fixedly attached to at least one location on the catheter.

66. (Previously Presented) The catheter system of claim 65, wherein the at least one location is at or near the proximal end of the catheter.

67. (Previously Presented) The catheter system of claim 65, wherein the at least one location is along a length, from the proximal end of the catheter to a location proximal to the stent.

68. (Previously Presented) The catheter system of claim 65, wherein the at least one location is spaced a distance from and is proximal to the stent.

69. (Previously Presented) The catheter system of claim 50, further comprising a connector coupled to the catheter, wherein the side member extends through the connector so as to be slidably positionable with respect to the catheter.

70. (Previously Presented) The catheter system of claim 50, wherein an outer diameter of the catheter is different than an outer diameter of the side member.

71. (Canceled)

72. (Currently Amended) A catheter system for stent delivery to a vessel bifurcation, the vessel bifurcation having a main vessel and a branch vessel, comprising:

- a catheter having a distal end, a proximal end, and a main vessel guidewire lumen that is adapted to receive a main vessel guidewire;

- a first stent having a side hole through a wall thereof, the first stent being disposed over the catheter;

- a first catheter radiopaque marker arranged on the catheter distal of the stent;

- a second catheter radiopaque marker arranged on the catheter proximal of the stent;

- a third catheter radiopaque marker arranged on the catheter aligned with the side hole of the first stent;

- a side member disposed adjacent and fixedly attached to at least one location on the catheter proximal the stent, the side member having a distal end, a proximal end, a branch vessel

guidewire lumen that is adapted to receive a branch vessel guidewire, and at least two side radiopaque markers positioned on the side member, a first of the side radiopaque markers being spaced from a second of the side radiopaque markers, wherein ~~at least one of the first~~ catheter radiopaque marker[[s]] and at least one of the side member radiopaque markers are side-by-side in a first configuration and separated in a second configuration; and

a branch stent deployment device having a balloon, a guidewire lumen, an inflation lumen that is adapted to supply a fluid to inflate the balloon, and a branch vessel stent disposed over the balloon, wherein the branch stent deployment device is adapted to be advanced over the branch vessel guidewire;

wherein a distal portion of the side member is disposed within at least a portion of the first stent and extends through the side hole of the first stent to a position distal of the side hole.

73. (Currently Amended) A catheter system for stent delivery to a vessel bifurcation, the vessel bifurcation having a main vessel and a branch vessel, comprising:

a catheter having a distal end, a proximal end, a main vessel guidewire lumen that is adapted to receive a main vessel guidewire, and catheter radiopaque markers positioned thereon;

a side member disposed adjacent the catheter, the side member having a distal end, a proximal end, a branch vessel guidewire lumen that is adapted to receive a branch vessel guidewire, and first and second side member radiopaque markers positioned thereon, the side member being integral with the catheter at a location proximal of the catheter radiopaque markers;

a stent having a side hole through a wall thereof being disposed over the catheter, wherein a first of the catheter radiopaque markers is arranged on the catheter distal of the stent, a second of the catheter radiopaque markers is arranged on the catheter proximal of the stent, and a third of the catheter radiopaque markers is arranged on the catheter aligned with the side hole of the stent; and

a branch stent deployment device having a balloon, a guidewire lumen, an inflation lumen that is adapted to supply a fluid to inflate the balloon and a branch vessel stent disposed over the balloon, wherein the branch stent deployment device is adapted to be advanced over the branch vessel guidewire;

wherein a distal portion of the side member extends through the side hole of the stent to a position distal of the side hole along the catheter, and wherein said first and third catheter

radiopaque markers and said first and second side member radiopaque markers are juxtaposed in a first configuration and separated in a second configuration.

74. (Previously Presented) The catheter system of claim 72, wherein the side member is integral with the catheter at a location proximal of the first stent.

75. (Canceled)